

WHAT IS CLAIMED IS:

1. An organic light emitting device capable of white light emissions, the device comprising at least one light emissive polymer and at least one small molecule material in two layers adjacent to each other, wherein the at least one small molecule material has a wide enough bandgap and a high enough electron mobility to function as both a hole blocking layer and an electron transport layer.
2. The organic light emitting device according to claim 1, wherein the at least one light emissive polymer comprises a polyfluorene-based blue light emissive polymer.
3. The organic light emitting device according to claim 1, wherein the at least one small molecule material has a lowest unoccupied molecular orbital (LUMO) value between the LUMO values of two adjacent layers of the at least one small molecule material.
4. The organic light emitting device according to claim 1, wherein the at least one small molecule material comprises bathocuproine (BCP).
5. The organic light emitting device according to claim 1, wherein the at least one light emissive polymer is formed by a solution-cast process and the at least one small molecule material is formed by an evaporation process.
6. The organic light emitting device according to claim 1, wherein the device has a multilayer structure on a substrate, the multilayer structure comprising a plurality of layers starting from the substrate in the following order:
 - (a) an anode;
 - (b) at least one hole injection layer or hole transport layer;
 - (c) the at least one light emissive polymer;

- (d) the at least one small molecule material;
- (e) one or more electron transport layers; and
- (f) a cathode.

7. The organic light emitting device according to claim 1, wherein the device has a multilayer structure on a substrate, the multilayer structure comprising a plurality of materials starting from the substrate in the following order:

- (a) indium tin oxide (ITO);
- (b) polyethylenedioxythiophene (PDOT);
- (c) A polyfluorene-based blue light emissive polymer;
- (d) bathocuproine (BCP);
- (e) tris(8-hydroxy-quinoline)aluminum (Alq₃);
- (f) sodium fluoride (NaF) or lithium fluoride (LiF); and
- (g) aluminum (Al).

8. A method for making an organic light emitting device capable of white light emissions, the method comprising:

forming a bi-layer comprising a light emissive polymer and a small molecule material in two layers adjacent to each other, wherein the small molecule material has a wide enough bandgap and a high enough electron mobility to function as both a hole-blocking layer and an electron transport layer; and

incorporating the bi-layer into an organic light emitting device.

9. The method according to claim 8, wherein the light emissive polymer comprises a polyfluorene-based blue light emissive polymer.

10. The method according to claim 8, wherein the small molecule material has a lowest unoccupied molecular orbital (LUMO) value between the LUMO values of

two adjacent layers of the small molecule material.

11. The method according to claim 8, wherein the small molecule material comprises bathocuproine (BCP).

12. The method according to claim 8, wherein the light emissive polymer is formed by a solution-cast process and the small molecule material is formed by an evaporation process.

13. The method according to claim 8 further comprising forming a multilayer structure on a substrate, the multilayer structure comprising a plurality of layers starting from the substrate in the following order:

- (a) an anode;
- (b) at least one hole injection layer hole transport layer;
- (c) the at least one light emissive polymer;
- (d) the at least one small molecule material;
- (e) one or more electron transport layers; and
- (f) a cathode.

14. The method according to claim 8 further comprising forming a multilayer structure on a glass substrate, the multilayer structure comprising a plurality of materials starting from the glass substrate in the following order:

- (a) indium tin oxide (ITO);
- (b) polyethylenedioxythiophene (PDOT);
- (c) a polyfluorene-based blue light emissive polymer;
- (d) bathocuproine (BCP);
- (e) tris(8-hydroxy-quinoline)aluminum (Alq₃);
- (f) sodium fluoride (NaF) or lithium fluoride (LiF); and

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(g) aluminum (Al).